

ABSTRACT

The present invention provides a process for forming cement in a well bore. In this process, a cement composition is formed that comprises a cement and one or more beads mixed with the cement. The cement composition containing the beads is displaced into the well bore, and an inert gas phase is introduced to the cement composition to control a density of the cement composition. The inert gas phase can be introduced by adding a gas generating material to the cement composition and/or a porous material to the cement composition. In an embodiment, the gas generating material is a nitrogen generating material that may be activated by an oxidizing agent. In another embodiment, the gas generating material is a hydrogen generating material, e.g., an aluminum powder. The present invention further provides a cement composition comprising a cement, one or more beads combined with the cement, and an inert gas phase created by, e.g., a gas generating material and/or a porous material.